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ABSTRACT

The teaching activities presented in this document focus on teaching students the language of science through reading and writing. The first activity engages students in writing everything they know about a particular science topic, devising questions for further study, reading and gathering information to answer the questions, developing specific statements about their knowledge of the topic, and sharing those statements in small groups. The second activity uses the product labels of household products to teach students new scientific words, the need for caution with such products, and the necessity of reading print in their immediate environment. The third activity involves students in writing what they learn about magnets from observations and the performance of specific tasks. The fourth activity requires students to describe what they already know about computers, develop questions to ask visiting experts, and categorize the information they learn from the answers. The fourth activity improves students' reading, listening, speaking, and writing skills as they read up on a science topic, interact with a visiting expert on the topic, and record what they learn from the expert's answers to their questions. The last activity uses a "feely" box to engage students in comparing and contrasting familiar and unfamiliar textures, and in talking and writing about textures. (HTH)

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Language Everywhere--Science

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Already-Know Time

When students are told, "Write for ten minutes whatever you *already know* or think about solar energy," there are bound to be complaints: "I don't know anything about it," or "How am I supposed to know?" Gary doesn't want to be wrong, and Molly believes it's the teacher's job to dispense all information. But having students write what I call "already-know statements" teaches them that they know more than they think they do and that they themselves are dispensers of information. Not only do students begin to feel some control over their learning, but they are using a strategy which will help them learn and remember more about what they read. No matter the subject, information and ideas become firmly cemented to what students already know.

Step one: *Write already-know statements.* Students have ten minutes to write what they know about the topic and what they think might be true. They are surprised that one thought triggers another.

Step two: *Make up questions.* The brainstorming students do while writing their already-know statements turns up questions about the topic. They reread their statements and write questions.

Step three: *Read and gather information.* Students find articles or books about their subject and note information which helps them answer their questions and decide if their statements are true. They are reading for a purpose.

Step four: *Write knowledge statements.* Students study their questions and answers. They put the resources and questions aside and ask themselves: What is interesting about my subject? What can I explain to another student? Answers to these questions become their "now-know" or knowledge statements.

Step five: *Share knowledge statements.* Students form small groups and share their knowledge statements. The writer reads each statement aloud so that listeners respond to the meaning rather than to the neatness or mechanical accuracy. The listeners ask questions to help them understand what they heard. They comment on the statements, often adding other examples to support the writer's thoughts.

By writing, questioning, reading, and sharing, students not only learn more from the references they use, but they also learn from themselves and from each other.

Dianne Walsh Hampton is a reading specialist with the Guilderland, New York, Central Schools.

August 1984

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Under the Kitchen Sink

What is the most dangerous place in the home? It may be the cabinet under the kitchen sink. Products stored there contain ingredients that may be harmful or fatal to humans. By examining the product labels, children learn the reasons for caution. From the labels they also learn new scientific words, collect information to support their reasoning, and reinforce the good habit of reading print in their immediate environment.

Prepare for this activity by bringing in empty and thoroughly washed containers of products that might be found under the kitchen sink or in other parts of the home. (With spray cans, wind masking tape around the spray nozzle.) The following empty containers (with label warnings and lists of ingredients intact) might be used:

- 1 bottle liquid dishwashing soap
- 1 bottle liquid all-purpose detergent
- 1 box crystal bleach substitute
- 1 spray can starch
- 1 spray can soil and stain remover
- 1 bottle liquid bleach
- 1 box water softener salt

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1 box powdered cleanser
1 spray can furniture polish
1 can powdered bleach and cleanser
1 bottle fabric softener
1 box baking soda
1 bottle ammonia
1 bottle liquid toilet bowl cleaner
1 can crystal drain opener
1 box crystal lye
1 spray can ant and roach killer
1 bottle shoe cleaner
1 bottle floor wax
1 bottle window cleaner
1 spray can air freshener
1 spray can oven cleaner
1 spray can plant bug killer

Each student receives a blank chart with spaces to fill in the *product names* and the *dangers* and *benefits* of each. In pairs or small groups, students talk together about the label warnings and the ingredients in the products.

Allow students to weigh the evidence and to decide from the data whether products could be harmful or fatal. The interaction of students in these groups is important as they work together to identify hazardous products. (Some groups may wish to extend their study of products to include those that children are tempted to eat or drink; they should plan what action needs to be taken if that happens.)

After collecting the data on the products, students can report their findings to the class or to other small groups. Encourage students to make further use of their new information by finding creative outlets. They can prepare a small booklet for younger children, write letters to parents of children in the school to alert them to dangerous products, or create posters for the school halls.

Aurelia Davila de Silva, Intercultural Development Research Association, San Antonio, Texas

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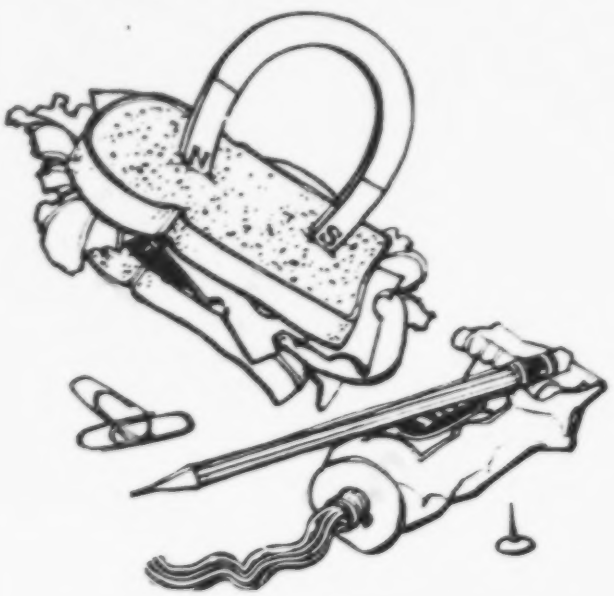
Learning and Writing about Magnets

Nothing gets young students hooked on science quicker than magnets. They are fascinated by the seemingly magical qualities of magnets, and their excitement helps them to write about their experiences.

Exploring science requires students to use language as they ask questions and write down their observations. I have my students record their impressions about the magnet experiments they perform or observe. In doing so, they develop their writing skills, as well as learn new science words and the importance of using exact language in observation.



Introduce students to the activity by setting out several magnets, a collection of small objects made of a variety of metals and other materials, several sheets of cardboard, and a box of paper clips. Let the students investigate the magnets without directions. Ask only that they write down what they find out about the magnets. Encourage students to use drawings to show what they mean.

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The students read their writings to the entire class to initiate discussion of the properties of magnets. I'm always impressed with the information students discover on their own.

Ahead of time, organize several specific tasks in boxes or dishpans. Include with each experiment a statement of instruction. After students explore and write on their own and discuss their writings, designate pairs of students, or groups of three or four, and let each group choose a task. Try to have enough supplies so that several groups can perform the same experiment simultaneously. Let students know that they will all have a chance to perform each task.

A set of tasks for magnets might include the following:

Task 1: Find out what kinds of things the magnet will pick up. Sort each object into the "yes" or "no" pan and record the items that the magnet attracted.

Materials: a variety of odds and ends (candle, penny, nail, spool, jar lid, pencil, foil, etc.), a pan labeled "yes" and a pan labeled "no," a magnet

Task 2: Test each magnet's strength by holding a piece of cardboard between it and a paper clip. Try different magnets, and try placing two pieces of cardboard between the magnet and the paper clip. What happens?

Materials: paper clips, at least two magnets of different strengths, several pieces of cardboard

Task 3: Attach a paper clip to the magnet. What happens? Try attaching a second paper clip to the first. Try adding other paper clips to form a chain. What happens?

Materials: paper clips, magnet

Task 4: Try touching two ends marked *N* and *S* together. Touch *S* to *S*; *N* to *N*. What happens? Why?

Materials: two bar magnets labeled *N* and *S*

As a final activity, ask students to write down their thoughts on what they found out about magnets and to illustrate the pages. Bind all the pages together and put the book in the science area for all to read.

I do not grade or correct the students' pages, other than noting what the student reads to me if I can't decipher it on my own. Technical writing skills can be acquired at a later time. At this point, the value for the students is in the process of doing the task, thinking about the problem, and using symbols and words that they know to record what they observed.

Sharron Cadieux, Mill Glen Road School, Winchendon, Massachusetts

December 198-

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Getting Acquainted with Computers

Considering the widespread use of computers for business, pleasure, and everything in between, it seems natural for students to show an interest in anything computer-related. Rather than simply letting your students pick up bits and pieces of information from advertisements and older siblings, give them a legitimate opportunity to talk, listen, write, and generally feel comfortable about computers.

In the following activity, which can be used with any age group, students describe what they already know about computers, pose questions to "experts," and categorize what they find out. This activity provides students with a smooth introduction to computers because at all times—in the verbal brainstorming, in talking over new information, and in updating idea cards—student interest directs the learning process. And whether a student is a recent initiate or a confirmed computer hacker, an idea exchange such as this one invariably offers something new to think about.

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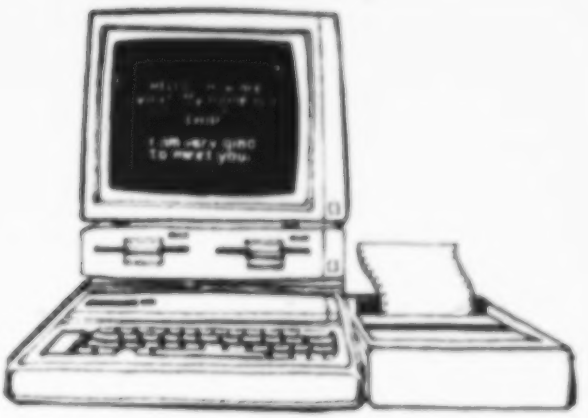
Prepare for this activity by contacting several computer "experts." These could be knowledgeable parents or other teachers who might volunteer to bring their personal computers into the classroom, or reliable teenage computer enthusiasts who would be flattered to serve as "experts." Ask them to set aside a class period to participate in a question-and-answer session and to be ready to explain how a computer functions as well as to answer more speculative or detailed questions.

A group brainstorming is a good way to introduce the topic of computers to the class. Ask students to take ten or fifteen minutes to generate computer-related words, ideas, or information using questions such as the following for inspiration:

- How often do you come in contact with computers? (Possible answers: grocery store checkouts, kitchen appliances, school heating system, car computers, computers that produce goods in factories)
- How are computers useful? (They free people to do other things, allow people to avoid dangerous tasks, speed tedious jobs, reduce error, etc.)

As students provide facts and comments, write each student's ideas and the student's name on a 3" × 5" "idea card." After the brainstorming session, distribute the cards to the students who originated the information and draw columns on the board with such headings as *What a computer can do, Parts of a computer, How to use a computer,* etc. Each student then uses masking tape to place his or her idea card in the proper column on the board. This collage of idea cards represents what the students already know about computers. As part of this initial discussion, ask students to think about what life would be like without computers. If there is sufficient student interest, you may want to provide a special *What if* column on the board for these speculations.



Next, ask students to form small groups and prepare questions to ask the experts. They should feel free to prepare nonfactual questions, such as "Do you think computers will be used more in teaching in the future?" Each group comes up with four or five questions, and one student from each group reads the group's questions aloud to the class so that duplicate questions can be avoided.

The second class period is devoted to the question-and-answer session with the visiting experts. You might set aside the first half of the period as a whole group session and then divide the class into as many groups as there are experts, letting each expert preside over a more in-depth discussion of student questions. As students talk with the experts, they write down any fact or bit of information that they find especially interesting, or anything that contradicts what they thought about computers. If the experts have any demonstrations or diagrams that they would like to show, let them present the information at the start of the class period.

During the third period, students share what they wrote down during the previous session. After talking about any new information they learned, they take their idea cards down from the board and revise or rewrite them if necessary. As a last step, the updated idea cards are placed again in the proper columns and student volunteers are chosen to read the information in the columns of the final collage.

Donna Wiseman, Texas A & M University, College Station, Texas

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Competent Communicators

Who wouldn't rather hear a *story* than a *lecture*? Whether your class is studying the birds, the bees, or the wildebeests, a guest speaker with personal anecdotes and photographs will stimulate student interest more than any amount of lecturing or research. An activity centering around a guest speaker makes students more competent communicators by getting them involved in:

- critical reading to prepare questions and phrase answers
- careful listening to record information
- speaking and writing to share with others the facts that impressed them

Our first-grade class was fortunate enough to find a doctoral student who raises cockatiels. To find your own guest speaker, try asking your colleagues for ideas, asking your students for suggestions, asking students if their parents have personal knowledge of the topic, and writing to local townspeople or college students who have an interest in the topic. Once you've made the initial contact with the chosen speaker, let your students show their interest by drafting a class invitation. As the scribe for the class, you write the letter on the board as it is dictated and ask students to read it back carefully to make sure that no vital information has been left out. Do students say where and when they would like the visitor to arrive? Is a room number given? Write a final copy of the letter and encourage students to draw pictures to accompany the letter and to write individual messages on their pictures. Include these personal invitations with the group invitation when you mail it to the guest speaker.

Allow students several class periods to read books and magazines about the topic, in preparation for phrasing questions that are detailed and specific. After these reading sessions, you can inspire question writing by starting a list of *Facts Known* on the board. Supply a category such as *What birds look like* and ask students to call out their ideas. The completed list reminds students what they already know about birds, and can be left on the board to be updated after the speaker visits. My students developed the following list:

What birds look like	*Where birds live*
feathers	nests
different colors	bird houses
different beaks	cages in a house
wings	
different feet	
different sizes	
What birds do	*What birds eat*
fly	worms
hop	berries
make nests	seeds
find food	bread
feed babies	crumbs
lay eggs	water
take baths	
sing	
some talk	

After students devise questions to ask the guest speaker, they can read their questions aloud to one another and talk about how *they* would answer each question, based on what they already know. To ensure that each student has the chance to ask at least one question, have students select one or two questions each, the ones that they most want the speaker to answer. Write these questions on chart paper, including the student's name, so that students can read their own questions aloud on the day the guest speaker visits. At that time, students take turns asking questions and the speaker

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answers by giving facts, showing photos, and sharing memories of incidents that illustrate the point. (Our speaker brought photos not only of her birds but of the eggs from which they hatched.) Students who are not asking questions can keep notepads handy and jot down details to be added to the fact list. My students made these notes:

Cockatiels can talk and learn words.

Cockatiels feet are different because they have 3 toes in the front and 1 in the back.

Cockatiels are covered with different colored feathers.

The notes that students take help them to update their *Facts Known* list. Even as the activity concluded, with a discussion of the updated fact list, the enthusiasm and accomplishment felt by my students ran high. After attentive reading, questioning, listening, and sharing of new ideas, they saw themselves, and rightly so, as *competent communicators*.

Carol Hittleman, Dix Hills, New York

April 1985

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Learning from a Feely Box

Purpose:
- to compare and contrast familiar and unfamiliar textures
- to talk and write about textures

Grade Level: K–2

Materials:
- a "feely box" made from a half-gallon cardboard milk container or a shoe box with a lid
- miscellaneous textures, such as a scrap of carpet, burlap, a woven basket, a fir twig, sand, rubber bands, marbles, etc.
- magazines, scissors, tape or glue, paper, pencils, crayons

Begin by preparing a "feely box" in which a student can insert a hand and can feel a texture without seeing the object. You can either open the top of a half-gallon cardboard milk container and cover the container with self-adhesive plastic paper (leaving the top open for the student's hand), or cut a hole in the side of a lidded shoe box. Place drawing and writing materials and the "feely box" on a table in the center of the room and post a class roster nearby.

As an introduction to describing textures, ask students to sit in a circle and close their eyes as you say, "Imagine that you are petting a baby bunny. Move your hand over the back of the bunny. Your fingertips are helping you feel the bunny. Now open your eyes and tell us what that bunny felt like." My students made these comments:

"My bunny's big."

"Mine's wiggly . . . and soft."

"Yeah, soft."

As students think of words, write them on the board. Point out that a number of different touch words can be used to describe the same texture.

Next, hold up the "feely box" and tell students that each will have the chance to close his or her eyes and feel the texture inside. You will place a different object in the "feely box" every day or two, or as long as student interest lasts. After a student feels the textured object in the box, he or she uses drawing materials from the center table and describes the texture, whether by writing descriptive words, drawing a picture of the texture, or cutting out and pasting magazine pictures that show a similar texture.

Students are responsible for putting checks by their names on the class roster after feeling each texture and for taping their response sheets up on the display board. When everyone's name is checked off, indicating that each person has felt an object, hold a class meeting to discuss all the responses and to open the "feely box" to see what's inside.

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A three-ring notebook makes a handy permanent record of student descriptions. After the objects from the "feely box" are taped or glued onto pages, students can review the experience individually, read their own and classmates' descriptions, and look at the drawings they created to match the textures.

As a follow-up activity, students enjoy the challenge offered by Tana Hoban's *Look Again* (Macmillan, 1981). This book contains unusual photographs of textures of ordinary objects. It invites active discussion. You might also consider showing *Scholastic Magazine*'s Beginning Concepts filmstrip, *Bumpy Lumpy*, which presents ordinary objects and unusual texture words with lively music.

Ellen R. Smachetti, North Adams, Massachusetts

August 1985

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